

- 8 -

CLAIMS

1. Regulating device of the water outlet chamber type, in particular for a cooling circuit for the cylinder heads of an internal combustion engine, mainly comprising a chamber component having an inlet and an outlet for the fluid to be regulated, and including a member for regulating the flow passing through said chamber in a longitudinal direction thereof, said regulating member comprising a valve component, which is movable in translation in this direction, is intended to close in a controlled manner a passage cross-section between the inlet and the outlet, and is rigidly fixed to a control shaft having a longitudinal extension, device (1) characterised in that the chamber component (2) further comprises at least one opening (6), formed in its constituent lateral wall between the inlet and the outlet, and in that said control shaft (X) carries a second closing component (7), which is integral in translation with said shaft (X), this second closing component (7) having two surface supports (9, 10) forming flat, parallel, surface guiding surfaces, which cooperate with two corresponding flat surfaces (9', 10') located on the internal wall of the component (2), so as to form two flat surface pairs (9, 9' and 10, 10') in sliding contact during the translation of the second closing component (7) into the component (2), this second closing component (7) being positioned on said shaft (X) and having a shape that is configured to regulate the flow of water passing through the opening (6) as a function of the regulation of the flow in respect of the passage cross-section (5').
2. Device according to claim 1, characterised in that the variations in passing flow resulting from the displacement of the shaft (X) in the region of the passage cross-section (5') and in the region of the opening (6) develop in the same way.
3. Device according to claim 1, characterised in that the variations in passing flow resulting from the displacement of the shaft (X) in the region of the passage cross-section (5') and in the region of the opening (6) develop in opposing manners.

4. Device according to any one of claims 1 to 3, characterised in that the chamber component (2) has a cylindrical general structure and an internal portion that is profiled by longitudinal segments, and in that the two surface supports (9, 10) are connected to each other by a brace (18), the distance between the two supports being of such a length that the second closing component (7) is guided in translation into the chamber component (2), whilst being substantially locked in rotation with a slight clearance in the plane perpendicular to the shaft (X) and about said shaft (X).
5. Device according to claim 4, characterised in that one (9') of the two guiding surfaces of the component (2) is located in the region of, and surrounds, the opening (6), and in that the guiding surface (9) forms a means for gradually closing the opening (6) and has a cut-out surface part (11).
6. Device according to any one of claims 1 to 5, characterised in that the two guiding surfaces (9, 10) have a protruding excess thickness (12) forming a flat, prominent surface that is intended to limit the surface of contact between the guiding surfaces (9, 10) of the second closing component (7) and the internal wall of the component (2), so as to limit friction between said guiding surfaces (9, 10) and the internal wall of the component (2), whilst at the same time superficially guiding the second closing component (7) into the chamber component (2).
7. Device according to any one of claims 4 to 6, characterised in that the brace (18) is in the form of a tapered blade, and in that two other braces (14, 15) connect the two guiding surfaces (9 and 10) by substantially matching the internal shape of the chamber component (2), so as to limit disruption of the flow passing through the chamber component (2).
8. Device according to claim 7, characterised in that a fourth brace (19), encompassing the hub (20) of the shaft (X) of the regulating member (3), is provided to connect the braces (14 and 15) to each other, so as to stiffen the structure of the second closing component (7).

- 10 -

9. Device according to claim 8, characterised in that the regulating member (3) is fixed to the internal wall of the chamber by means of a stress-retrieving stirrup (13), resting on two interior projections (14', 15') providing permanent support surfaces (16) for the stirrup (13) of said regulating member (3), in that each of the two braces (14 and 15) has a recess (17) that is intended to cooperate with corresponding interior projections (14', 15') of the internal wall of the component (2), in that the brace (19) connecting the two braces (14 and 15) and the stress-retrieving stirrup (13) is disposed, in the assembly position of the second closing component (7), on the regulating member (3), and in that the same exposed surface is superimposed on said brace (19) and said stirrup (13) in the direction of flow, so as to limit losses in pressure of the fluid flow passing through the component (2).

10. Device according to claim 9, characterised in that the section of the brace (19), in the longitudinal direction, decreases in the direction of flow, the cross-section of the brace (19) being substantially triangular.

11. Device according to any one of claims 1 to 10, characterised in that the regulating member (3) comprises a thermoactive or heat-responsive means, such as a wax cartridge, immersed in the fluid present in the component (2) and activating the translation of the valve component (4).

12. Device according to any one of claims 1 to 11, characterised in that the second closing component (7) has, in the region of the guiding surface (9) intended to slide along the flat surface (9') of the internal wall of the component having the lateral opening (6), at least one support element (21') for at least one corrugated gasket (21) intended to flatten the guiding surface (9) against the internal wall of the component (2), so as to increase the tightness between the second closing component (7) and the internal wall of the component (2), in the region of the lateral opening (6).

13. Device according to any one of claims 1 to 12, characterised in that the second closing component (7) is in the form of a frame (8) forming a ring, the section of which is dimensioned relative to the section of the chamber component (2), and having two wings forming the guiding surfaces (9, 10).

14. Device according to any one of claims 1 to 13, characterised in that the chamber component (2) has, in the region of the lateral opening (6), a pipe or pipette (22) forming an exterior conduit segment that is continuous with the second closing component (7), thus providing a bypass fitting towards a new circuit loop or branch.

15. Device according to any one of claims 1 to 14, characterised in that it has a pipe or exterior connection fitting (23) in the region of the opening of the passage merging into the chamber component (2).

16. Device according to any one of claims 1 to 15, characterised in that the chamber component (2) also has a second lateral opening, which is extended by an exterior pipe (24) that is intended to receive a temperature sensor.

17. Device according to claim 1, characterised in that the chamber component (2) also comprises a second opening, formed in its constituent lateral wall, and a third closing component, which is integral in translation with the shaft (X) and is positioned on said shaft (X), and has a shape that is configured to regulate the flow of water passing through the second opening as a function of the regulation of the flow in the region of the passage (5').